

## ABSTRACT

An internal combustion engine includes a throttle controlling mechanism; a valve characteristic varying mechanism  
5 which controls an internal EGR rate by the control of an overlap period  $P_a$  and a non-overlap period  $P_b$ ; and an output setting means which sets a required amount of engine output. The throttle controlling mechanism controls an opening degree of a throttle valve to fully open the throttle valve at a predetermined load  
10  $D_a$  with an increase in an operating amount  $D$  in a first load range  $F_a$  which covers load range below the predetermined load  $D_a$  in a low-load range, and to keep the throttle valve fully opened in a second load range  $F_b$  which covers a load range over the predetermined load  $D_a$ . The valve characteristic  
15 varying mechanism controls the engine output by controlling the overlap period  $P_a$  or the non-overlap period  $P_b$  according to the required amount  $D$  over the entire load range, and controls valve operation characteristics to obtain a maximum internal EGR rate at the predetermined load  $D_a$ .